

Subject: SIMSS/MPS-Aura Engineering Release 3.8 Delivery for ETS  
Date: Sat, 4 Oct 2003 13:43:46 -0400  
From: Ernest Quintin <equintin@csc.com>  
To: Willie.N.Fuller@nasa.gov

Willie,

We are pleased to deliver Release 3.8 of the ETS Multimode Portable Simulator (MPS) for Aura. This engineering release delivery contains:

- Changes to the ETSAura module to allow any combination of telemetry point values to be controlled via the ETSF or MPS operators when MPS is used as an ETSF Front End. This resolves DR SMOdr21806 (ETS0484).

Modifications to the Scenario module to further enhance conservation of system resources and provide additional debugging information for analysis of user script execution. This completes the resolution of DR SMOdr20272 (ETS0476) and DR SMOdr20273 (ETS0477).

While most of the reported and discovered problems have been fixed, there are still some remaining conditions that may require further development and testing. Those will be resolved in a subsequent release.

There are eight attachments to this letter.

Attachment A describes the capabilities included in this release.

Attachment B describes installation instructions for this release.

Attachment C describes special operating instructions for this release.

Attachment D contains the resolved DR descriptions

Attachment E contains the system limitations.

Attachment F contains an updated release history summary matrix.

Attachment G contains a listing of all the external documentation used in producing this release.

Attachment H contains an updated Mission Systems Configuration Management (MSCM) form.

The updated software executable modules are being delivered on CD-ROM. Two copies of the CD will be given to Guy Cordier, who will forward one copy to Raytheon at Denver and will use the other for installation on the MPS simulator PCs in Building 32. The updated software is also being given to Ken Lavery of the MRTT, who will install it at the various ground stations as needed.

The System User's Guide is being updated to include the new capabilities.

If you have any questions about this delivery, please do not hesitate to contact Estelle Noone or myself.

Ernest Quintin  
301-805-3649

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## Attachment A – Summary of Operational Changes

### **Operational Capabilities of SIMSS/MPS-Aura Release 3.8**

New or modified capabilities with this release are noted in **Bold**.

#### Telemetry:

- Transmit telemetry in IP or Serial (clock/data) mode
- Pack telemetry packets and CLCWs into CADUs when in Serial mode
- Generate one stream of CADUs when in Serial mode
- Generate one stream of telemetry formatted as EDUs when in IP mode
- Start or stop one telemetry stream
- Generate telemetry packets from information contained in the PDB
- Maintain telemetry nodes from information contained in the PDB
- Populate telemetry packets with data values from information contained in the PDB
- Generate correct secondary headers for SC, GIRD, and SUROM-TIE (no secondary header) telemetry packets using information from the PDB
- Generate instrument telemetry packets using secondary key information from the PDB
- Display EDU data when in IP mode
- Display CADU data when in Serial mode
- Set values into telemetry points by mnemonic
- Display telemetry node values by mnemonic
- Convert telemetry values to Engineering Units (EU) for display using information from the PDB
- Accept operator-entered telemetry values in EU and convert to Raw Counts for inclusion in telemetry packets
- Create a checkpoint file of all telemetry mnemonic values at any time under user control.
- Maintain consistency between “mom-kid” telemetry points
- Reset packet count for the telemetry stream
- Static packet data can be overwritten (by byte location) and by modification of telemetry mnemonic
- Incrementing packet sequence counters per APID
- Generation of individual APIDs can be inhibited
- Telemetry logs will be created (viewable by offline utility)
- Packet Headers and Packet Data are updated
- Packet data can be shown in hexadecimal or octal format and addressed in hexadecimal or decimal form
- Packet Sequence Counters can be reset
- Packet Sequence Counters can be modified
- Packet Version field can be modified
- Packet APID field can be modified
- Packet Type field can be modified

- Packet Secondary Header Flag field can be modified
- Packet Length field can be modified
- CCSDS Unsegmented TimeCode (CUC) can be modified
- Packet rate may be controlled
- CLCW transmitted via EDUs when in IP mode
- IP packets are transmitted with variable lengths
- CLCW can be overridden by the operator
- Transmission of CLCW can be inhibited when in IP mode
- Scenario file (script) capability to set telemetry nodes and buffers
- Set telemetry data values in response to spacecraft commands received (end-item verification)
- Set initial telemetry data values at initialization
- Allow simultaneous display and set of multiple telemetry container items via GUI screens
- Simulate spacecraft memory dumps
- Use the PDB telemetry state text file to locate end-item verifier values
- Maintain and update telemetry data values in APID 1000
- Telemetry parameters may be set and viewed by Parameter ID
- CLCW Transmit Start and Stop is coupled to H/K Telemetry Start and Stop
- Telemetry values may be set using simple expressions
- Telemetry values may be set using trigonometric expressions
- Telemetry values may be set using Boolean expressions
- Telemetry values may be set to other telemetry mnemonic values
- Telemetry values may be saved in intermediate variables for later use
- TES Segmented Packets are emulated
- CLCW Transmit rate may be set by the operator
- Telemetry data values are validated for fit into packet space
- Current enable status and transmit rate for all APIDs is viewable via status display
- vcProcessor module discards VC63 VCDUs when creating files for playback
- The PDB Red/Yellow Limits file is used to refine initial telemetry values.
- Signed telemetry data values are validated as one's and two's complement integers upon user input, as appropriate.
- Displays of telemetry and command container item names may be saved and restored.
- The VCDU Sequence Counter field occupies 32 bits in APID 1000.
- Direct ingest of telemetry-related PDB flat files
- Interface with a 1553 Bus. Transmit telemetry packets over the 1553 Bus.
- Accept telemetry and CLCW packets from an external source in IP mode
- Update telemetry parameter values to reflect data received from the external source
- Update CLCW field values to reflect data received from the external source.
- Forward, via IP interface, the telemetry and CLCW packets received from the external source.
- Modify telemetry parameter values and CLCW field values in externally received packets prior to re-transmission, in response to operator directive.

- Accept CADUs from an external source in serial mode
- Extract telemetry packets and CLCWs from externally received CADUs
- Pack externally received telemetry packets and CLCWs into CADUs and forward via serial interface
- Preserve time in Secondary Headers of externally received telemetry packets OR replace with MPS-generated time.
- Support for operator entry of 1750A telemetry values as Engineering Units.

Command:

- Identify commands using information from the PDB
- Display event messages with command mnemonics and submnemonics
- Set telemetry points in response to commands received (end-item verification) using information from the PDB
- Recognize spacecraft Command Loads
- Display Command Load data
- Copy Command Load data to a Memory Dump buffer
- Inhibit the Command Load data copy facility via operator directive
- Validate checksums of received Command Loads
- Ingest type AD, BC, and BD commands
- Display Total CLTUs count
- Reset Total CLTUs count
- Display Rejected CLTUs count
- Reset Rejected CLTUs count
- Display Instrument commands count
- Reset Instrument commands count
- Display Spacecraft commands count
- Reset Spacecraft commands count
- Display BC commands count
- Reset BC commands count
- Display BD commands count
- Display current Spacecraft CLCW
- Update Spacecraft and instrument CLCW
- Display current Instrument CLCW
- Validate commands based on individual, all, or none of the following validation criteria: CLTU Start and Tail Sequences, BCH Error Code, Transfer Frame Header Fields, FARM (Valid Frame Sequence), User Command Packet Header
- Generate event messages based on ingest
- Log raw commands (viewable by offline utility)
- Display raw command in hexadecimal or octal format addressed in either hexadecimal or decimal fashion
- Display command packet headers for instrument commands
- Display command packet headers for spacecraft commands
- Update command accepted and rejected counters in telemetry

- Command submnemonics are saved in container items and may be viewed after command receipt
- Expected Spacecraft ID changed to CC Hex
- TES and OMI segmented commands are recognized.
- The Function Code is used to identify HIRDLS commands.
- The two's complement checksum of instrument commands is validated.
- Direct ingest of command-related PDB flat files
- Enable and disable automatic setting of end-item verifier telemetry points for commands received, in response to operator directive.
- Interface with a 1553 Bus. Receive command packets from the 1553 Bus.

#### Time:

- Maintain and update SC time (GIRD)
- Maintain and update GMT time
- Synchronize SC and GMT times
- Set SC time to time in externally received telemetry packets.
- Set SC time to time broadcast via the ETSF 1553 bus.

#### General:

- Control all simulator module functions via scenario scripts
- Selection of scenario scripts may be via operator type-in or via a file selection browse window
- Start scenario scripts in response to commands received
- Start a scenario script from a scenario script
- Execute multiple scenario scripts simultaneously
- Provide operator control of multiple scenario scripts started by the operator
- Save the last 10 operator directives
- Allow editing of saved operator directives before re-execution
- EDOS Service Header (ESH) fields may be viewed
- ESH field contents may be modified by the operator
- Validation of Command Data Block (CDB) header fields of commands received
- Modification of expected values of CDB header fields
- All viewable buffers may be displayed
- Addition, deletion, and modification of command end-item verifiers via SQL scripts
- Logs of commands received or telemetry transmitted may be retransmitted via IP output or Serial output
- Expected Spacecraft ID may be modified in EOSGS module
- CLCW ESH field contents may be modified by the operator
- Event messages to the screen may be inhibited or enabled by severity (color)

- Scenario scripts may contain IF-then-ELSE-ENDIF and WHILE-ENDWHILE conditional execution directives
- The Scenario module may interface with multiple modules
- The user may create a disk file giving the names of all running Scenario scripts at any time.
- The user may kill any or all running Scenario script(s) at any time.
- Intermediate variables A – Z permit saving values as real numbers – extended to all modules that accept directives
- Intermediate variables Aq – Zq permit saving values as long integers – extended to all modules that accept directives
- CREATE and DELETE directives permit the user to create temporary variables of Real type.
- The Serial Output module can accept directives from the operator or via a scenario script.
- The Event Message window has been separated from the project window and has been made resizable.
- Receipt of CADUs from a serial interface and extraction of telemetry packets is via the EOSXtract module.
- Interface with the 1553 Bus is via the E1553Bus module.
- Improved telemetry and command logging capability.
- Improved Event Message logging capability.
- Project Save and Restore operations have been simplified.
- Individual modules may be given meaningful names in context.
- Projects may be given meaningful names.
- Server and Client DOS windows run minimized upon startup.
- FrameMonitor module added to permit simulator to adjust telemetry transmit rate to match telemetry receive rate (specific to ETSF Front End)
- PktProcessor module added to permit self-diagnosis of transmitted telemetry

## **Attachment B – Installation Instructions for SIMSS/MPS-Aura Release 3.8**

This attachment contains the instructions for installing the PDB files and the SIMSS/MPS-Aura Release 3.8 Server and Client. The information presented in this attachment is divided into three major sections. The first section contains abbreviated installation instructions, the second contains a summary of the installation changes, and the third section contains detailed instructions for performing initial and subsequent installations.

**The abbreviated installation instructions assume that the user will install or has already installed the recommended version of the Java Runtime Engine, JRE 1.2.2-Build 14.**

The information presented in this attachment has been checked for accuracy by the independent test team.

### **B-1: Abbreviated Installation Instructions**

These instructions are intended for the experienced user.

1. If not already done, install the Java Runtime Engine, Build 14, by selecting the file **jre-1\_2\_2\_014-windows-i586.exe** in the root folder of the CD and following the prompts.  
**IMPORTANT:** When prompted for an installation folder, modify the path to **C:\jre1.2.2**. See the detailed instructions for more information.
2. Install the SIMSS/MPS-Aura Release 3.8 Client software by executing the **Setup.exe** program in the Client folder of the CD.
3. Install the SIMSS/MPS-Aura Release 3.8 Server software by executing the **Setup.exe** program in the Server folder of the CD.
4. If not previously done, create a folder under **D:\mps\_pdb\AuraPDBs** to hold the Aura PDB source files. Copy the Aura PDB source files into this new folder. Twelve files are needed. See the list in Paragraph B-3.3 for the files to be copied.
5. When initializing the SIMSS/MPS-Aura simulator for the first time, all Projects needed must be built and saved.



## **B-2: Summary of changes**

Patch Build 14 of Version 1.2.2 of the Java Runtime Engine (JRE) is being included with this delivery. Testing has shown that Sun Microsystems has fixed many of the resource leaks that were a problem with earlier versions of the JRE.

## **B-3: Detailed Installation Instructions**

This is the complete procedure for performing an initial or subsequent installation of the SIMSS/MPS-Aura simulator Release 3.8, and associated software, data files, and COTS programs on a PC.

Materials Needed:

- One or more versions of the Aura Project Data Base (PDB)
- The CD containing the SIMSS/MPS-Aura Release 3.8 software

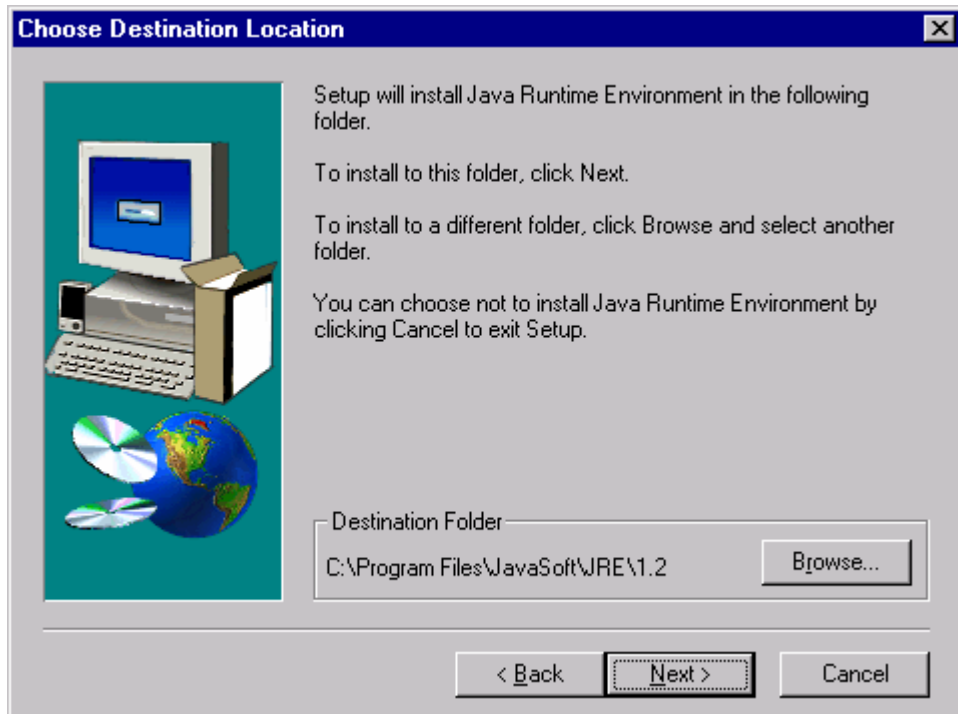
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### **B-3.1: Java Runtime Engine Installation**

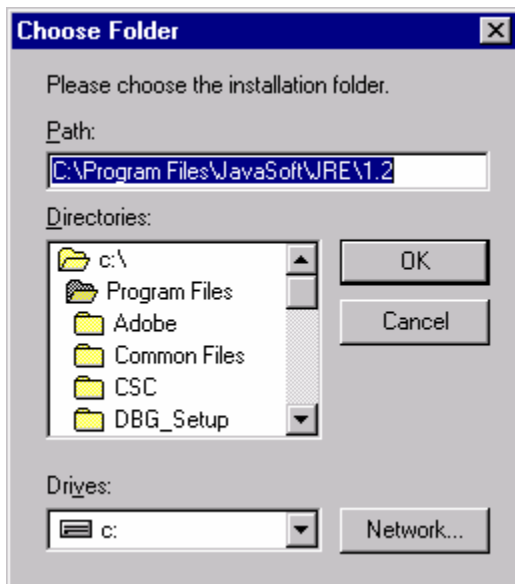
Patch Build 14 of Version 1.2.2 of the JRE is included on the delivery CD. It is recommended that this version of Java be installed. If this version of Java is already installed then skip to Paragraph B-3.2.

1. Insert the CD containing the SIMSS/MPS-Aura Release 3.8 into the CD drive and navigate to it using either Windows Explorer or My Computer.
2. Double-click on the file named **jre-1\_2\_2\_014-windows-i586.exe** in the root folder. This will cause the Java Runtime Engine to be installed. When responding to the installation prompts, set the installation folder to **C:\jre1.2.2** by modifying the installation path as shown in the following pictures. This is necessary because the DOS program that starts the Client software cannot parse spaces in the path.

When the **“Choose Destination Location”** window appears, click on the Browse button.



The result will be the following **“Choose Folder”** browse window:



Modify the path in the **Choose Folder** browse window to be **C:\jre1.2.2** as shown in the following picture. Select **OK**, then select **NEXT** from the **Choose Destination Location** window.



### **B-3.2: Installation of the Aura Server and Client software**

The steps in this paragraph cause the SIMSS/MPS-Aura Client and Server software to be installed on the PC.

1. Insert the delivery media into the appropriate drive.
2. To install the Aura Client:
  - a) On the desktop, click on the Start button, and then select Run from the resulting menu.
  - b) When the Run window appears select the Browse... button.
  - c) From the Browse Window, select the Removable drive that contains the installation CD.
  - d) Click on the Client folder.
  - e) From within the Client folder, double click on the **Setup.exe** filename.
  - f) A window with the title "Run Window" will appear. Click on the Okay button to proceed to the next step.
  - g) The screen will be filled with an Aura Client background and a smaller window with the title "Welcome to Aura Client 3.8" will appear. Click on the Next button to proceed to the next step.
  - h) Next, a window will show the completion status as the files are copied. When the copying is complete click on the Finish button to finish the installation.
  - i) An Aura Client icon will now be installed on the desktop.

3. To install the Aura Server:

- a) On the desktop, click on the Start button, and then select Run from the resulting menu.
- b) When the Run window appears select the Browse... button.
- c) From the Browse Window, select the Removable drive that contains the installation CD.
- d) Click on the Server folder.
- e) From within the Server folder, double click on the **Setup.exe** filename.
- f) A window with the title "Run Window" will appear. Click on the Okay button to proceed to the next step.
- g) The screen will then be filled with an Aura Server background and a window with the title of "Welcome to Aura Server 3.8" will appear. Click the Next button to proceed.
- h) Next, a window will show the completion status as the files are copied. When the copying is complete click on the Finish button to finish the installation.
- i) An Aura Server icon will be installed on the desktop.

### **B-3.3: PDB Download**

The next step is to copy the PDB onto the hard drive. You will need at least one version of the Aura PDB. The following PDB flat files are needed, where xxxxxx corresponds to the version portion of the filename:

cmd\_desc\_xxxxxx.pdb  
cmd\_fixdata\_xxxxxx.pdb  
cmd\_parm\_xxxxxx.pdb  
cmd\_vardata\_xxxxxx.pdb  
cmd\_verify\_xxxxxx.pdb  
t1m\_calcurve\_xxxxxx.pdb  
t1m\_desc\_xxxxxx.pdb  
t1m\_dstate\_xxxxxx.pdb  
t1m\_packet\_xxxxxx.pdb  
t1m\_parm\_xxxxxx.pdb  
t1m\_polyconv\_xxxxxx.pdb  
t1m\_rylim\_xxxxxx.pdb

Add a folder to your chosen directory structure to hold the source files of the Aura PDB.

Copy the desired version of the PDB into the folder just created. If desired, more than one version of the PDB may be copied. Be sure to copy each version into its own folder.

## **Attachment C - Special Operating Instructions**

This attachment contains new special operating instructions for SIMSS/MPS-Aura Release 3.8. The information presented in this attachment has been checked for accuracy by the independent test team.

A User's Guide is being updated to include the information presented in this section. When complete, the User's Guide will be available from the ETS home page

<http://esdis-it.gsfc.nasa.gov/ETS>.

### **ETSAura Module Internal "kid" telemetry points**

The deficiency associated with the forwarding of "mom & kid" telemetry when the MPS is being used as an ETSF Front End has been corrected.

Background: Setting a value into a "mom" telemetry point by MPS results in the setting of its associated "kid" telemetry points. In order to have MPS-controlled values persist while a data stream of ETSF external telemetry packets is received and processed, MPS changes to kid telemetry points are saved as "sticky" updates. The saving of "sticky" updates only for kid points allows some kids to receive values from the ETSF while other kids of the same mom maintain MPS values. However, not all of the bits within mom telemetry points are defined as kid telemetry points by the database. These bits may be thought of as unused bits. These bits could not be controlled by the MPS operator when the MPS was being used as an ETSF Front End.

To eliminate this deficiency, the ETSAura module has been modified to create internal kid telemetry points for any unused bits in each mom telemetry point. The general mnemonic format for the new telemetry points is

"KID\_<mom's Parm ID>\_<msb>\_<lsb>"

The MPS operator should not need to use these mnemonics. The MPS operator should be aware of these internal kid telemetry points only because they have the same functionality as the database-defined telemetry points and may appear in MPS event messages. The kid telemetry points are saved along with the other telemetry points in checkpointed telemetry files.

## **Scenario Module Script Processing Improvements**

The scenario module's processing has been improved to allow the nesting of IF and WHILE statements to any depth and in any order. Changes were also made to provide better syntax checking and provide additional debugging information for testing scenario script execution.

1. The syntax checking logic now verifies that:
  - Each IF statement is terminated with an ENDIF and each WHILE statement is terminated with an ENDWHILE.
  - Only one IF or ELSEIF clause is executed when multiple conditional expressions in the same statement are true.
  - Multiple ELSE clauses are not allowed in the same IF statement.
  - The presence of unexpected (and unprocessed) characters on the same lines as IF, ELSEIF, ELSE, ENDIF, WHILE and ENDWHILE keywords will be reported.
2. When debugging is enabled for a scenario script, all of the conditional expressions in the script are evaluated. This allows the user to find all of the errors within all nested conditional expressions during one execution of the script. But the script is also being executed, so only the directives contained within the TRUE clauses are actually passed to the linked module for processing.
3. Additional validation of SLEEP time fields is being done. Warning (yellow) event messages will be generated for invalid characters in time fields. When a sleep time field is zero, it does not satisfy the sleep requirement within a WHILE loop.
4. Module link (channel) processing was enhanced. A module link number may appear on a line by itself. Each directive within a WHILE loop is saved with its original default or explicit link number so that the same link number is used with each directive during each execution of the loop.
5. The logic for parsing scenario script directives was changed to simplify the algorithm and eliminate potential memory leaks.

## System Limitations Affecting Scenario Directives

During regression testing of the Scenario module two problems were discovered that could adversely affect the execution of some scenario scripts. These previously existing but undetected problems are present in earlier MPS releases. Since these problems could not be resolved prior to this delivery and there are workarounds, they are listed here and summarized in Attachment E as limitations.

Limitation 1: Hexadecimal values cannot be assigned to container variables of type double and float in operator directives.

Example:           Set A 0xFF  
                  causes the variable A to be set to 0 instead of 255. There  
                  no error messages that the intended assignment failed.

There are three groups of double variables that might be used in scenario scripts and have this limitation.

- (a) generic module variables A-Z
- (b) user variables made with the CREATE directive
- (c) telemetry point engineering values (<mnemonic>\_\_EU)

One workaround is to replace the hexadecimal value with the equivalent decimal value.

Set A 0xFF becomes   Set A 255

A second workaround is to replace the double variable with a variable of a different type. Generic variables AQ-ZQ are 64 bit integers. The raw telemetry point variables (without \_\_EU in name) are 64 bit integers.

Set A 0xFF becomes   Set AQ 0xFF

A third workaround is to assign the hexadecimal value to an integer type variable prior to assigning it to the double type variable.

Set A 0xFF becomes   Set AQ 0xFF  
                          Set A = AQ

Limitation 2: When a module is paused or stopped, its container values may be read but not updated. This makes it possible for properly constructed WHILE loops to run as infinite loops. During each loop's execution at least one warning (yellow) event message will be generated. These warning event messages can fill the event window and consume system resources as each message is written to the event log. In the following example

assume the module receiving the directives is paused and the current value of A is zero.

```
WHILE (A < 5)
  ; Other directives
  Set A += 1
  Sleep 1000
ENDWHILE
```

The condition for the WHILE loop is initially true. When the set directive attempts to increment the value of A, the directive cannot be executed and an event message is produced. The next time the WHILE condition is evaluated the value of A hasn't changed so the condition stays true. The loop condition will remain true until the target module's execution is resumed or the scenario script is terminated.

Should this situation occur, the event message window will receive yellow warning event messages like the following.

```
ID:1 Line:3 Link not connected or module not running: Set A += 1
```

The ID field is the script identification number. The operator should either resume the paused module or terminate the scenario script.



## **Attachment D – Resolved and Unresolved Discrepancy Reports**

The following Discrepancy Reports (DR) and Change Requests (CR) have been closed by and are being delivered with SIMSS/MPS-Aura Release 3.8. The resolved DR and CR are listed in the second table below, which provides the DR/CR Number, Status, Severity, and a short description. A full description of each DR/CR follows the summary tables. Complete information on all DRs/CRs may be accessed via the Internet at address <http://edosultra30.gsfc.nasa.gov/ddts>.

### **Summary of Closed Discrepancy Reports**

<b>Critical (Severity 1)</b>	<b>Urgent (Severity 2)</b>	<b>Routine (Severity 3)</b>	<b>Change Requests</b>	<b>Total</b>
0	3	0	0	2

<b>ETS No.</b>	<b>SMO No.</b>	<b>Type</b>	<b>Severity</b>	<b>Description</b>
ETS0476	SMOdr20272	DR	2	MPS connected to ETSF crashed during SCIF 3 Dry Run
ETS0477	SMOdr20273	DR	2	MPS script executed repetitively (and inappropriately)
ETS0484	SMOdr21806	DR	2	MPS as ETSF Front End garbles telemetry.

### **Summary of Open Discrepancy Reports**

There are no open DRs or CRs with this release:

DR: SMOdr20272 (ETS0476)  
Status: NEW

Related NCR/PRF:  
Class: ETS

Submitted: 030327  
Forwarded: 030409

Title: MPS connected to ETSF crashed during SCIF 3 Dry Run

DR Type: Problem

Activity Name: SCIF3-DryRunOther:

Testname:

Aqua:

Terra:

Aura:

#### SUBMITTAL INFORMATION

Project: ETS  
Date found: 030314  
Arch. Comp.: none of the above  
Subsystem: Aura  
Rel/Ver: ??  
Lvl 4 Reqmt:  
Category: stability  
Workaround:  
Attachments:  
LAN:  
PDB version:  
Submitter: dramey  
Organization: Other  
Phone number: 301-286-4471  
Email: debbie.ramey@gsfc.nasa.gov

\*\*\*\*\* Configuration (Added 030327 by dramey) \*\*\*\*\*

Please describe the current system configuration:

MPS connected to ETSF

\*\*\*\*\* Problem (Added 030327 by dramey) \*\*\*\*\*

Please describe the problem you are experiencing below, including what you did, what you expected to happen, and what actually happened:

During the SCIF 3 dry-run, MPS crashed. We were able to reboot the MPS, reset some parameters, and continue. Programmer (Ernest Quintin) observed crash and captured available information.

DR: SMOdr20273 (ETS0477)  
Status: NEW

Related NCR/PRF:  
Class: ETS

Submitted: 030327  
Forwarded: 030409

Title: MPS script executed repetitively (and inappropriately)

DR Type: Problem

Activity Name: SCIF3-DryRunOther: Testname:

Aqua:

Terra:

Aura:

#### SUBMITTAL INFORMATION

Project: ETS

Date found: 030314

Arch. Comp.: none of the above

Subsystem: Aura

Rel/Ver: ??

Lvl 4 Reqmt:

Category: function

Workaround:

Attachments:

LAN:

PDB version:

Submitter: dramey

Organization: Other

Phone number: 301-286-4471

Email: debbie.ramey@gsfc.nasa.gov

\*\*\*\*\* Configuration (Added 030327 by dramey) \*\*\*\*\*

Please describe the current system configuration:

MPS connected to ETSF

\*\*\*\*\* Problem (Added 030327 by dramey) \*\*\*\*\*

Please describe the problem you are experiencing below, including what you did, what you expected to happen, and what actually happened:

During the MCL execution portion of the SCIF 3 dry-run, some instrument command counters continued to periodically increment after dispatch of MCL commands. Further investigation is needed.

DR: SMODr21806 (ETS0484)  
Status: NEW

Related NCR:  
Class: ETS

Submitted: 030807

Title: MPS as ETSF Front End garbles telemetry

#### SUBMITTAL INFORMATION

Project: ETS  
DR Type: Problem  
Rel/Ver: 3.7  
Subsystem: Aura  
Module: Simulator  
Affected-Requirement:  
Test Phase: acceptance test  
Severity: 2  
Date found: 030801  
Location: GSFC  
Submitter: Ernest Quintin  
Organization: ETS Dev Group  
Phone number: 301-805-3649  
Email: equintin@csc.com

\*\*\*\*\* Problem (Added 030807 by equintin) \*\*\*\*\*

Please describe the problem you are experiencing below, including what you did, what you expected to happen, and what actually happened:

The telemetry forwarded by the MPS when being used as a Front End to the ETSF does not accurately reflect the data output by the ETSF. Data values do not change when changed at the ETSF.

## Attachment E – System Limitations

### E.1 SIMSS/MPS-Aura Release 3.8 Limitations

The following limitations apply to SIMSS/MPS-Aura Release 3.8. Some of these are Discrepancy Reports (DRs) against SIMSS baseline products and have been recorded in their DR repository.

Problem Description	Workaround
<p>Hexadecimal values cannot be assigned to container variables of type double and float in operator directives. Generic module variables A-Z, variables made with the CREATE directive, and telemetry point engineering values (&lt;mnemonic&gt;__EU) are variables of type double.</p> <p>For example: Set A 0xFF causes the variable A to be set to 0 instead of 255.</p> <p>This affects operator directives and directives within scenario scripts.</p>	<p>One workaround is to replace the hexadecimal value with the equivalent decimal value.</p> <p>Set A 0xFF becomes Set A 255</p> <p>A second workaround is to use a variable with a different type. Generic variables AQ-ZQ are 64 bit integers. The raw telemetry point variables (without __EU in name) are 64 bit integers.</p> <p>Set A 0xFF becomes Set AQ 0xFF</p> <p>A third workaround is to assign the hex value to an integer type variable prior to assigning it to the double type variable.</p> <p>Set A 0xFF becomes Set AQ 0xFF Set A = AQ</p>

Problem Description	Workaround
<p><u>Limitation 2:</u> When a module is paused or stopped, its container values may be read but not updated. This has the potential for properly constructed WHILE loops in scenario scripts to run as infinite loops and generate a large volume of redundant warning (yellow) event messages. For the following example assume that the module receiving the directives is paused and that the current value of A is zero.</p> <pre> WHILE (A &lt; 5) ; A never changes ; Other directives to paused module ; Other directives to running modules Set A = A + 1 ; This statement fails Sleep 1000 ENDWHILE </pre> <p>The condition for the WHILE loop is initially true. When the set directive attempts to change the value of A inside the loop, the directive cannot be executed. The next time the WHILE condition is evaluated, the condition is still true. The loop condition will remain true until the target module's execution is resumed or the scenario script is terminated. In either case, any directives within the loop that are directed to running modules will have been executed more than the intended 5 times.</p>	<p>Should this situation occur, warning level (yellow) event messages are generated for each directive that cannot be sent to a paused or stopped module. The same event messages will be generated each time through the loop. This can fill the event log and consume system resources. The operator may either resume a paused module or restart a stopped module, or terminate the scenario script.</p>
<p>The Generic Container Buffer display is limited to 1400 bytes of data (= 700 words, or 350 double words). A request for more data than that will result in a display of 1400 bytes of information. <i>This is SIMSS Defect # 102.</i></p>	<p>To view data that is beyond byte 1400 of the buffer, set the offset to 1400, or as required to view the data.</p>

<b>Problem Description</b>	<b>Workaround</b>
Certain APIDs are included in the PDB tlm_packet file without any Interval or Slot number information. MPS supplies a default Interval of one second and a default Slot number of zero. However, the packet timing appears to be less accurate than for those APIDs that have at least one Interval field filled in the tlm_packet file. More investigation is necessary before writing this as an MPS DR.	Explicitly supply an Interval when enabling an APID that has no non-zero Interval in the tlm_packet file.
The E1553Bus module will crash MPS if it is invoked on a PC that does not have a 1553 Bus interface board installed.	Avoid adding the E1553Bus module to any Project if the PC does not have a 1553 Bus interface board.
When converting 1750A parameter values to Engineering Unit Floating Point format, MPS rounds the result to six decimal places.	External calculations may be used to check the accuracy of the raw values transmitted in telemetry.
The AVTEC Serial Input and Serial Output modules will crash MPS if either is invoked on a PC that does not have an AVTEC Serial I/O card installed.	Avoid adding either of these modules to any Project if the PC does not have an AVTEC Serial I/O card.

### **Attachment F - Release History Summary Matrix**

Attached is the SIMSS/MPS-Aura simulator release history summary matrix, updated to reflect the Release 3.8 delivery. Modules inherited from the SIMSS baseline have the SIMSS Release Number, while the MPS-Aura modules ETSGS, ETSXtract, ETS1553Bus, and ETSAura have their current Release Number.



## Release History Summary Matrix

**System:** SIMSS/MPS-Aura

Release Number		1.0	2.0	3.0 Beta	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
Delivery Date		3/16/01	6/15/01	9/28/01	1/11/02	8/9/02	8/23/02	10/25/02	1/10/03	4/25/03	6/13/03	8/8/03	10/03/03
Configuration Item	CI No.												
Core (Client)	1.1	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0 <sup>1</sup>	9.0	9.0
Core (Server)	1.2	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
ETSAura (Client) Formerly SCAURA	1.3	1.0	2.0	3.0	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
ETSAura (Server) Formerly SCAURA	1.4	1.0	2.0	3.0	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
ETSGS (Client) Formerly EOSGS	1.5	1.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.7	3.7
ETSGS (Server) Formerly EOSGS	1.6	1.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.7	3.7
IP Input (Client)	1.7	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
IP Input (Server)	1.8	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
IP Output (Client)	1.9	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
IP Output (Server)	2.0	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
Logging (Client)	2.1	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
Logging (Server)	2.2	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0

<sup>1</sup> Re-compiled after SIMSS Rel. 8.0 to deploy enhancements desirable to MPS.

Release Number		1.0	2.0	3.0 Beta	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
Delivery Date		3/16/01	6/15/01	9/28/01	1/11/02	8/9/02	8/23/02	10/25/02	1/10/03	4/25/03	6/13/03	8/8/03	10/03/03
Configuration Item	CI No.												
Scenario (Client)	2.3	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0 <sup>2</sup>	9.0	9.0
Scenario (Server)	2.4	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
Serial Input (Client)	2.5	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
Serial Input (Server)	2.6	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
Serial Output (Client)	2.7	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
Serial Output (Server)	2.8	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
TxFile (Client)	2.9	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
TxFile (Server)	3.0	4.0	4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
vcProcessor (Client) <sup>3</sup>	3.1		4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
vcProcessor (Server)	3.2		4.1	5.0	6.0	6.0	6.0	7.0	7.0	8.0	8.0	9.0	9.0
ET SXtract (Client) <sup>4</sup> Formerly EOSXtract	3.3							1.0	1.0	1.0	1.0	3.7	3.8
ET SXtract (Server) <sup>4</sup> Formerly EOSXtract	3.4							1.0	1.0	1.0	1.0	3.7	3.8
ETS1553Bus (Client) <sup>4</sup> Formerly E1553	3.5							1.0	2.0	3.0	3.1	3.7	3.8
ETS1553Bus (Server) <sup>4</sup> Formerly E1553	3.6							1.0	2.0	3.0	3.1	3.7	3.8

<sup>2</sup> Re-compiled after SIMSS Rel. 8.0 to deploy enhancements desirable to MPS.

<sup>3</sup> Added with Release 2.0

<sup>4</sup> Added with Release 3.3

Release Number		1.0	2.0	3.0 Beta	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
Delivery Date		3/16/01	6/15/01	9/28/01	1/11/02	8/9/02	8/23/02	10/25/02	1/10/03	4/25/03	6/13/03	8/8/03	10/03/03
Configuration Item	CI No.												
PktProcessor (Client) <sup>5</sup>	3.7											9.0	9.0
PktProcessor (Server)	3.8											9.0	9.0
FrameMonitor (Client)	3.9											9.0	9.0
FrameMonitor (Server)	4.0											9.0	9.0

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<sup>5</sup> Added with Release 3.7

## **Attachment G - Documentation References**

The following documents have been employed as the main sources for direction and information in producing Release 3.8 of the SIMSS/MPS-Aura simulator.

<b>Document</b>	<b>Location*</b>
Earth Observing System (EOS) Common Spacecraft Program Interface Control Document between the EOS Aura Spacecraft and the EOS Ground System, Dated May 23, 2001, Document No. D27515, Preliminary (more commonly known as "The Spacecraft to Ground ICD")	1
Earth Science Data and Information (ESDIS) System Project, Appendix Z – Aura Spacecraft Interface with Control Center, Supplement to the EOS Aura Spacecraft to Ground ICD, January, 2003	1
Data Format Control Document for the Earth Observing System (EOS) Mission Operations Segment (EMOS) Project Database Volume 1: Aura Users Doc. No. 423-41-65, November 15, 2001	4
TRW, EOS Chemistry Spacecraft Flight Software Requirements Specification, ES-SDA-005, Rev. A, dated 23 August, 2000	4
TRW, EOS Chemistry Spacecraft Flight Software Requirements Specification, Appendix A, 1553B Bus Interface Control Document ES-SDA-005-01, Rev. C, dated June 19, 2002	6
TRW, EOS Aura Spacecraft Flight Software User's Guide, No.: D31189, version dated 15 September, 2000	4
TRW, EOS Aura Command Allocation Document, No.: D31174, Rev D, dated June 1, 2002	4
TRW, EOS Aura Telemetry Allocation Document, No.: D31175, Rev C, dated June 2, 2002	4
TRW, EOS PM-1 Spacecraft Equipment Specification for Transponder Interface Electronics, No.: EQ4-4957, latest version dated 11 February, 1999	4
TRW, Interface Control Document Between the Earth Observing System (EOS) Data and Operations System (EDOS) and the EOS Ground System (EGS) Elements CDRL B301, April 28, 2001	1
TRW, Interface Control document for the High Resolution Dynamics Limb Sounder (HIRDLS), Rev. D No.: D26477, dated July 20, 2001	3
TRW, Interface Control Document for the Microwave Limb Sounder (MLS), Rev C No.: D26475, dated March 15, 2002	3
TRW, Interface Control Document for the Ozone Monitoring Instrument (OMI) System, Rev. B No.: D26478, dated November 8, 2002	3
TRW, Interface Control Document for the Tropospheric Emission Spectrometer (TES), Rev. C No.: D26476, dated February 28, 2002	3

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\*See Location Legend

<b>Document</b>	<b>Location*</b>
Consultative Committee for Space Data Systems, CCSDS 102.0-B-4: Packet Telemetry Blue Book, Issue 4, Nov. 1995	2
Consultative Committee for Space Data Systems, CCSDS 202.1-B-1: Telecommand Part 2.1 – Command Operations Procedures Blue Book, Issue 1, Oct. 1995	2
NASA, GSFC, Earth Observing System Data and Information System (EOSDIS) Test System (ETS) Level 4 Requirements for the MPS/Aura. Attachment G of the MPS/Aura Release 3.0 delivery package	5

Location Legend:

Number	Designation
1	<a href="http://romulus.gsfc.nasa.gov/">http://romulus.gsfc.nasa.gov/</a> (secure site, password required)
2	<a href="http://www.ccsds.org/publications.html">http://www.ccsds.org/publications.html</a>
3	Received via email from Aura Instrument Planning Group
4	Hardcopy from ESDIS Library
5	<a href="http://esdis-it.gsfc.nasa.gov/ETS/etsdoc.html">http://esdis-it.gsfc.nasa.gov/ETS/etsdoc.html</a>
6	Received via email from PVVF personnel

## **Attachment H — Mission Systems Configuration Management Form**

This attachment contains the completed Mission Systems Configuration Management (MSCM) form for the delivery of SIMSS/MPS-Aura Release 3.8.

### Mission Systems Configuration Management Form

<u>1. ORIGINATOR</u> Estelle Noone	<u>2. ORGANIZATION</u> CSC	<u>3. PHONE</u> 301-805-3653	<u>4. E-MAIL ADDRESS</u> enoone@csc.com
<u>5. ELEMENT</u> ETS (SIMSS/MPS-Aura)		<u>6. INSTALLATION PRIORITY</u> Routine	<u>7. TRACKING NUMBER</u> (Assigned by CM Office)
<u>8. SOURCE CHANGE REQUEST(S):</u> ETS delivery of MPS for EOS Aura (SIMSS/MPS-Aura)		<u>9. APPROVALS</u> <div style="display: flex; justify-content: space-between;"> <div>Element Manager</div> <div>_____</div> <div>_____ / _____ / _____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Flight Ops Director</div> <div>_____</div> <div>_____ / _____ / _____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Operations Manager</div> <div>_____</div> <div>_____ / _____ / _____</div> </div>	
<u>10. DELIVERED SYSTEM</u> (Check all that apply)			
	Name	Version	Media Identification
<input type="checkbox"/> Hardware	_____	_____	_____
<input checked="" type="checkbox"/> Software	SIMSS/MPS-Aura	R3.8	CD-ROM
<input type="checkbox"/> Database	_____	_____	_____
<input checked="" type="checkbox"/> Documentation:			
	SIMSS/MPS-Aura delivery package	N/A	via email
	_____	_____	_____
	_____	_____	_____
<input type="checkbox"/> Other	_____	_____	_____
<u>11. CHANGE DESCRIPTION</u> Release 3.8 of SIMSS/MPS-Aura _____ _____ _____			
<u>12. ATTACHMENT(S):</u> Check if YES <input checked="" type="checkbox"/> Description: SIMSS/MPS-Aura Release 3.8 delivery package (cover letter with attachments) dated 10/03/03 _____			
<u>13. CM OFFICE USE</u>			
	Location (Bldg/Room)	Slot location(s)	
Hardware	_____ / _____	_____	
Media	_____ / _____	_____	
Documentation	_____ / _____	_____	
Installation date	_____ / _____ / _____	CM Office Signature _____	

Form MSCM (970327)

### Mission Systems Configuration Management Form

<u>1. ORIGINATOR</u> Estelle Noone	<u>2. ORGANIZATION</u> CSC	<u>3. PHONE</u> 301-805-3653	<u>4. E-MAIL ADDRESS</u> enoone@csc.com																																													
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<u>8. SOURCE CHANGE REQUEST(S):</u> ETS delivery of MPS for EOS Aura (SIMSS/MPS-Aura)		<u>9. APPROVALS</u> <div style="display: flex; justify-content: space-between;"> <div>Element Manager</div> <div>_____</div> <div>____/____/____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Flight Ops Director</div> <div>_____</div> <div>____/____/____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Operations Manager</div> <div>_____</div> <div>____/____/____</div> </div>																																														
<u>10. DELIVERED SYSTEM</u> (Check all that apply) <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 20%;">Name</th> <th style="width: 10%;">Version</th> <th style="width: 30%;">Media Identification</th> <th style="width: 30%;">Identification Date</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td>Hardware</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Software</td> <td>SIMSS/MPS-Aura R3.8</td> <td>CD-ROM</td> <td>10/03/03</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Database</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Documentation:</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>SIMSS/MPS-Aura delivery package</td> <td>N/A</td> <td>via email</td> <td>10/03/03</td> </tr> <tr> <td></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td></td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Other</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table>					Name	Version	Media Identification	Identification Date	<input type="checkbox"/>	Hardware	_____	_____	_____	<input checked="" type="checkbox"/>	Software	SIMSS/MPS-Aura R3.8	CD-ROM	10/03/03	<input type="checkbox"/>	Database	_____	_____	_____	<input checked="" type="checkbox"/>	Documentation:					SIMSS/MPS-Aura delivery package	N/A	via email	10/03/03		_____	_____	_____	_____		_____	_____	_____	_____	<input type="checkbox"/>	Other	_____	_____	_____
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